



File Code: 3420  
Route To:

Date: November 6, 2002

Subject: Bark Beetle Activity in Pine Flats Campground

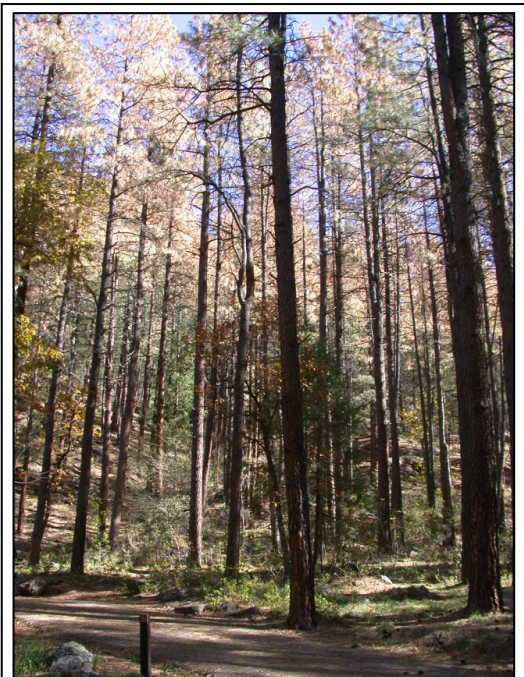
To: District Ranger, Red Rock RD, Coconino NF ATTN: Ken Anderson

In October, Deborah Terrion contacted me in regard to bark beetle activity at the Pine Flats Campground in Oak Creek Canyon, Coconino NF. On October 13 and November 5, 2002, I visited the campground with Jim Rolf, Silviculturist with the Peaks RD, to evaluate the area for bark beetle risk and current stand conditions. My evaluation consisted of a thorough ground survey to identify currently infested trees within and adjacent to the campground. Upon finding an area of infestation, we recorded the number of trees attacked, their diameter at breast height (DBH), and basal area.

A total of 63 currently infested trees were located within the campground area on the east side of the highway (**Table 1, Figure 1**). Most of the attacks were initiated by pine engraver beetles (*Ips pini*) and showed characteristic fading from the top down. Western pine beetle (*D. brevicornis*) has also attacked the lower portion of the bole on many trees. In addition to the infested trees within the campground, approximately 55 more infested trees were observed in trees immediately adjacent to the campground. Conditions on the east side of the highway are dominated by relatively large-diameter ponderosa pine growing at a high density.

No bark beetle activity was observed in the campground on the west side of the highway. Previous thinning treatments in this area have led to a lower stand density with widely spaced large-diameter pine and a greater deciduous understory of oak (**Figure 2**).

Trees growing in developed recreation sites are often stressed due to repeated damage caused by campers and soil compaction caused by roads and large vehicles parked off-road. During periods of drought or below-average precipitation such as has been occurring over the last few years, these trees can become particularly stressed. This is further exacerbated by the relatively high density of ponderosa pine growing in some areas of the campground. When trees are growing at high densities, there is more inter-tree competition for resources such as light, water, and nutrients



**Figure 1.** Bark beetle-infested ponderosa pine near south end of Pine Flats CG.



(Kolb, et al., 1998). The combined effect of these factors is to lower the trees' production of defensive compounds and, consequently, increase susceptibility to bark beetle attack. This seems to be what is occurring within the Pine Flats Campground. Bark beetles may also prefer these dense stands, compared with more open stands, due to microclimate differences (Amman and Logan, 1998).

No stand hazard rating models have been developed for pine engraver beetles species attacking ponderosa pine, primarily because beetle populations are driven by drought and factors leading to large amounts of slash. Stand hazard rating for *Dendroctonus* bark beetles of ponderosa pine involves measures of tree size, stand or group density (basal area), and the percent of host trees within the stand. In general, ponderosa pine stands that have an average DBH greater than 12 inches and a basal greater than 120 ft<sup>2</sup>/acre are considered at high risk to bark beetle attack (Schmid and Mata, 1992; Chojnacky, et al., 2000; Negrón, et al., 2000). On the Coconino NF, stands that have less than 80 square feet of basal area per acre should be considered the lowest risk. It is important to keep in mind that while thinning is an excellent long-term preventive measure, thinning alone may not be enough to protect trees from bark beetles. In order for the leave trees to benefit from thinning, they need soil moisture before beetles start an attack. Also, all the fresh cut "slash" (cut tree trunks, limbs, and trimming debris) must be treated properly to keep beetles from breeding in it and moving into adjacent residual green trees.

**Table 1.** *Bark beetle attacks and tree data within the Pine Flats Campground, Red Rock RD, Coconino NF.*

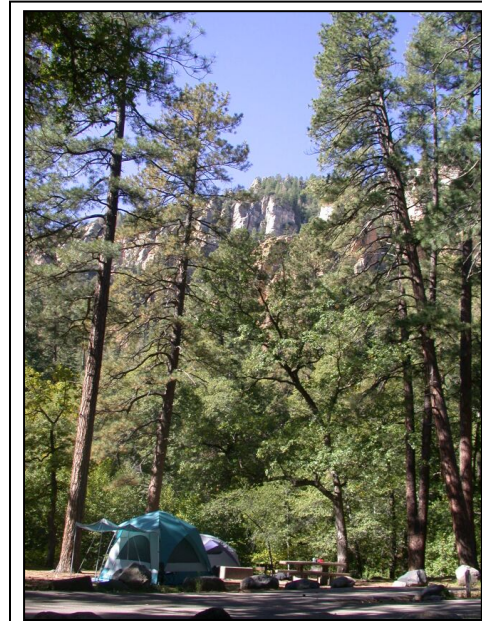
| CAMP SITE         | NUMBER OF<br>INFESTED PINE | AVE. DBH<br>(inches) | BASAL AREA<br>(ft. <sup>2</sup> /ac) |
|-------------------|----------------------------|----------------------|--------------------------------------|
| 38                | 2                          | 10.5                 | 130                                  |
| 41                | 2                          | 16.3                 | 100                                  |
| 46                | 2                          | 12.9                 | 130                                  |
| 48                | 2                          | 19.9                 | 110                                  |
| 50                | 3                          | 15.3                 | --                                   |
| 51                | 20                         | 16.4                 | 130                                  |
| 52                | 1                          | 20.5                 | 170                                  |
| 53                | 9                          | 16.5                 | 150                                  |
| 54                | 7                          | 16.2                 | 160                                  |
| 55                | 14                         | 15.3                 | 210                                  |
| South Entrance    | 1                          | 14.0                 | --                                   |
| <b>TOTAL/MEAN</b> | <b>63</b>                  | <b>15.78</b>         | <b>143.3</b>                         |

### Recommendations

Controlling bark beetle populations that attack ponderosa pine falls under two categories: prevention and suppression. In the long term, preventive strategies are most effective in reducing tree losses. Losses can be avoided in most cases by maintaining thrifty, vigorous trees. Thinning dense stands of ponderosa pine relieves competitive stress among the remaining trees, making them less susceptible to attack. A treatment of thinning from below to a target basal area of 80 will help to reduce the overall susceptibility of the stand in the long term. Thinning from

below has been experimentally demonstrated to increase the resistance level of the residual mature pine overstory (Feeney, et al., 1998). As mentioned above, thinning slash must be removed from the site or treated in such a way as to prevent its becoming brood material for Ips beetles. This is extremely important to consider in the coming year while bark beetle populations are high.

Based on the current stand conditions and setting, ponderosa pines within the campground seem to be highly susceptible to beetle attack. Therefore, removal of infested trees is recommended and may also provide some protection to surrounding trees. However, because these insects are very common, removal of infested trees is not a guarantee of protection. This approach is generally only recommended in combination with the long-term preventive approach or the use of preventive sprays. It is recommended that the infested trees be removed this winter before the brood completes their development and adult beetles emerge next spring. If trees are cut, they must either be removed from the site or, if left, should have the bark stripped off or significantly scorched to kill the developing beetle brood. Because of the campground's close proximity to Oak Creek, the use of preventive sprays does not seem feasible unless extraordinary care is taken.



**Figure 2.** Conditions at Pine Flats CG on the west side of the highway.

If you have any questions regarding my assessment of current bark beetle activities within the area, its potential effect on residual standing trees, or my recommendations, please let me know.

/s/ Joel D. Mcmillin  
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cc: Deborah Terrion, Mailroom R3 Coconino, James Rolf, Michael Manthei, Leonard Lucero, John Anhold, Debra Allen-Reid, Douglas L Parker, Ken Anderson

**References Cited**

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